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Misuse of Blood Transfusion

The proper use of blood transfusion poses a problem and many physicians deserve criticism for the manner in which they have met the problem. The reason for misuse is unawareness of valid indications for the procedure. A surgical operation is not an indication for blood transfusion. Uterine bleeding is not an indication—neither is a low hematocrit reading. Blood transfusion is not a tonic, it is not a placebo, it does not improve wound healing. Above all, it is not a substitute for careful consideration of the patient and his problem.

Other than the need for exchange transfusions, there are two valid indications for transfusion of blood: improvement of the stability of the circulatory system when the blood volume has been reduced in such a way as to imperil the patient; and improvement of the oxygen-carrying capacity of the blood to prevent acute hypoxia or invalidism.

During the Korean conflict, use of massive blood transfusions saved the lives of many of the most severely wounded soldiers. The blood was given rapidly in large amounts—10 liters in an hour; 20 liters in a day. Critics, relying on so-called common sense rather than first-hand experience, declared that the surgeons in Korea used too much blood. The surgeon's problem was not, however, to answer such criticism, but to reestablish and maintain the stability of the patient's circulatory system while he underwent an essential surgical procedure.

Contrast this with a surgical service in a hospital where every patient undergoing major elective surgery receives a liter of blood the day before operation to make sure he is not suffering from "chronic shock." On such a service one patient with polycythemia received a liter of blood when his hemoglobin was 18 gm. Contrast the practice of surgeons in Korea with that of a cancer service where once a week hematocrits are done and every patient with a reading below 38% receives 2 units. These instances are not invented and are not exaggerated. They are flagrant examples of what might be called the secretarial practice of medicine. In such a practice, a stenographer types out the laboratory request, and when the patient flunks the hemoglobin test the stenographer types out a transfusion request.

When a transfusion is prescribed, the remote—although not less real—dangers should be balanced against a present, real, even urgent, requirement of the patient. Anemia alone is not a sufficient justification. The requirement of the anemic patient for oxygen-carrying capacity should be balanced against his present capacity. Much of a person's 15 gm. of hemoglobin is a reserve against strenuous exertion. For a sedentary life, 10 gm. is often sufficient, and most bedfast patients are comfortable with as little as 5 or 6 gm. Many patients can learn to live with chronic anemia, and a little quiet encouragement is often as helpful as repeated blood transfusions.

Acute blood loss must also be regarded with critical judgment. A healthy adult can sustain the rapid loss of one-third of his blood volume without

serious derangement of circulatory stability. Recently, during the delivery of a child a woman lost by final actual measurement 700 ml. of blood. It is reasonable to suppose that she could have sustained this loss without danger and without transfusion. In fact, however, the blood loss was replaced by a transfusion of 6 units. This procedure seems unreasonable.

It is commonplace to insist that the hemoglobin concentration be "normal" before a patient comes to surgery. This is another instance where common sense appears to ignore physiology. Actually, hemoglobin concentration represents oxygen-carrying capacity which is rarely a limiting factor during surgery. Blood dilution studies made on patients during surgical operations have demonstrated that, when blood volume is maintained, the vital signs do not begin to show a deficiency of oxygen-carrying capacity until the hemoglobin concentration is less than 7 gm.

The dangers of infection, hemosiderosis, and transfusion reaction are well known. Try as we may we can only reduce the incidence of reactions. They cannot be eliminated and patients will continue to be damaged as a result of blood transfusions. For example, it was a tragedy when a young woman died as the result of transfusion of one unit of blood. How much more tragic it seemed when it was learned that her hematocrit had been 40% when the transfusion was begun.

Thoughtless prescription of blood transfusion is playing Russian roulette with bottles of blood instead of a revolver. While the odds are in the physician's favor that nothing will go wrong, the patient takes the risk. (Crosby, W.H., Walter Reed Army Medical Center, Misuse of Blood Transfusion: Postgrad. Med., 26: A-42 to 46, November 1959)

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Chemical Burns

Accidental contact with chemicals—or their misuse—is prominent among causes of injury and death, and constitutes one of the potential hazards of modern life. It has been pointed out that there are about 25,000 chemical products now available for use in the home, industry, and agriculture, and approximately 3,300 deaths a year result from misuse of these substances.

Chemical accidents give rise to various superficial and systemic reactions of many degrees, dependent upon strength, amount, concentration, degree of penetrability, mode of action, and manner and duration of contact of the chemical agent. The resulting effects include burns, stricture from corrosion, perforation of organs by penetration of the chemical, respiratory irritation, asphyxiation, systemic intoxication, and deleterious reactions in the gastrointestinal and nervous systems, kidneys, liver, and other organs.

Physiologic Effects of Chemicals in Burns. The chief difference between chemical burns and those resulting from other causes is that the destructive process occasioned by chemical burns continues until the effect

of the cauterizing agent is neutralized. Characteristically, chemicals differ in action. The local lesion of some may be prominent or may even cause death. Still other chemicals produce both local and systemic evidence of injury.

Concentration of chemicals in locations where they enter or leave the body is a factor of major importance, such as in those pathologic lesions produced in the gastrointestinal and respiratory tracts, and in the kidneys. Another common effect of many chemicals is a deleterious hepatotoxic action.

In injuries attributable to mineral acids and alkalis, the common factor responsible for trauma is the H or OH concentration, respectively. Other factors responsible for corrosive injury include coagulation, precipitation, dehydration, or actual solution of protein.

Pathology. Burns from acid chemicals may be extremely destructive—their effect is immediately apparent. Conversely, alkali burns are deceptive—their immediate effect may appear slight, but it may progress seriously by direct extension. For this reason they are often insidious.

After ingestion of a corrosive agent there may be rapid circulatory collapse, shock, severe corrosion of the oral cavity, pharynx, and esophagus, perforation of the stomach and intestines, and/or rapid death. Repair may be followed by formation of dense avascular scar tissue. Stricture formation of the esophagus is a common sequela to such scar formation. Incomplete regeneration of epithelium over the cicatrix of a chemical injury may lead to chronic ulceration.

The appearance of the necrotic mucosa may serve to identify the responsible corrosive. Sulfuric acid characteristically blackens and chars tissue; phenol leaves a firm, thick, moderately dry, dull gray or brown eschar; hydrochloric acid leaves a white to gray-brown discoloration; nitric acid may show a yellow component.

In burns from corrosive chemicals, injury—especially acute laryngeal and pulmonary edema—may follow aspiration, particularly if the corrosive agent is volatile.

Causal Factors and Effects. In chemical burns, as in few other accidental injuries, the lesions are specifically related to the type of chemical agent. A partial list of some of the agents and their characteristic actions is included in the report.

Oxalic acid is frequently ingested by mistake because of its physical resemblance to magnesium sulfate. In addition to a cauterizing effect, systemic toxicity results from removal of calcium ions from tissue fluid with mild to severe manifestations of hypocalcemia. Delayed death may be caused by injury to the kidney—concentration of the acid at the port of excretion leading to degeneration and necrosis of renal tubular epithelium.

Hydrofluoric acid is a highly corrosive substance and will continue to destroy tissue until it has been removed. It is also systemically toxic.

Phenol is not only a skin irritant, but also a local anesthetic. It can be absorbed by the skin and appear in the urine. When phenol comes in contact

with the skin it should be washed off immediately with ethyl alcohol, and oil dressings applied to prevent progressive burning to black gangrene.

Characteristic lesions produced by chromic acid are "chromholes." These lesions usually have the appearance of small darkish spots surrounded by a peeled area with a center ring that is the outer border. Pus is usually found in these holes, the walls of which are tissue undergoing necrobiosis. The lesions are usually painless because chromic acid produces local anesthesia—the wounds become third degree burns before pain is felt.

Acetic acid is one of the strongest organic acids and has the property of penetrating tissues readily, causing dermatitis and ulcers. Fumes of this acid cause irritation of mucous membranes.

Accidental burns from lye are frequently reported from ingestion of the substance, particularly by children. The esophagus is the most frequent site. There are reports of bronchial constriction and other injuries from industrial and agricultural handling of chemicals, such as organic phosphates contained in insecticides and inorganic arsenics contained in wallpapers and paints.

Pulmonary irritants are encountered in many occupations. They particularly injure areas with a moist surface favoring solution and localization of the chemical agent. After excessive exposure, there may be necrotizing pharyngitis or tracheobronchitis. Some gaseous substances principally affect the trachea and larger intrapulmonary air passages. Initial symptoms may be those of mild coryza. After a period of several hours, subsequent development of air hunger points to involvement of the deeper respiratory structures. These volatile substances include chlorine, iodine, bromine, sulphur, nitrogen dioxide, and others. Some irritants affect the pulmonary parenchyma and include the oxides of nitrogen and phosgene.

Emergency Treatment. In the treatment of chemical burns immediately after an accident, the first steps are directed toward decontamination by irrigation, dilution, and neutralization of the causative agent.

Thorough irrigation of the burned area with large quantities of water should be done immediately to accomplish dilution of the chemical agent. It should be emphasized, however, that neutralizing a caustic chemical before it has been thoroughly diluted is not justifiable. This is because the heat generated in the neutralization process may in itself be sufficient to cause a burn. In burns from simple solvents, irrigation of the burn lesion for 10 minutes or more is usually adequate. However, in burns from stronger and more potent chemicals, both acid and alkali, irrigation should be continued for at least 30 minutes or more. On occasion, with such strong acids as hydrofluoric acid, it has been necessary to continue irrigation and washing for 3 to 5 hours, or even to 12 hours.

Next, a neutralizing agent, specific for the particular offending chemical, is applied to the burn lesion. In an acid burn, a neutralizing agent of weak alkali, such as a solution of bicarbonate of soda, 16 gm. (0.5 ounce) in 500 ml. water; or in an alkali burn, dilute acid, such as 1% solution of citric acid is

used. After the chemical agent has been removed by neutralization, the injured area should again be washed with copious amounts of water to carry away any heat of the neutralizing agent before it can damage the tissues.

When the exposed mucous membranes of the nose, mouth, and adjacent areas have been burned with a chemical, the parts are covered with an application of a bland ointment after irrigation and neutralization of the chemical agent.

Care of chemical burns of the eyes takes priority over all else. Copious irrigation with water, keeping the eyelids open, is the first step. To avoid synechia of the iris, it is important to keep the pupils dilated. Instillation of warm vaseline or other lubricant ointments and frequent moving of the eyelids will prevent them from adhering to the eyeball. In addition, an antibiotic should be instilled to prevent secondary infection. Attention by an ophthalmologist should be provided as quickly as possible.

The patient who has ingested a caustic chemical and incurred burns of the mouth, throat, and esophagus is given milk and olive oil by mouth as quickly as possible after the accident and later at frequent intervals. Hospitalization must be accomplished immediately because the earlier treatment is instituted the better are the chances of recovery.

Subsequent Management. This phase of management follows closely the treatment indicated for thermal burns and usually involves highly specialized care, plastic surgery, reconstructive or replacement surgery, and judicious employment of antibiotics and steroids.

Greater insight into the physiology of burns, appreciation of the important changes in fluid and electrolyte balance in the severely burned patient, and development of supportive and antibiotic drug therapy have eliminated many complications and reduced the mortality previously associated with severe chemical burns. (Lewis, G.K., Chemical Burns: Am. J. Surg., 98: 928-937, December 1959)

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Frostbite

Frostbite is a generic term for a clinical syndrome that follows exposure of an extremity to freezing temperatures—the result of frozen tissue. Other cold injuries, such as trench foot, immersion foot, and various ill-defined conditions of the feet are closely allied to frostbite in that each represents a clinical entity resulting from prolonged exposure of a part to cold; however, in these cases, tissue freezing is absent.

For clinical purposes, frostbite is divided into four degrees of severity: (a) first degree, characterized by erythema, edema, and desquamation of the superficial layers of the skin; (b) second degree, manifested by blister formation with only partial thickness of the skin involved; (c) third degree, full

thickness of the skin involved resulting in ulceration into the subcutaneous tissue, and (d) fourth degree, entire thickness of the skin involved and damage to adjacent soft tissue and bone with loss of the part. In many instances, all degrees of frostbite are present in a frostbitten extremity.

The author reviewed 35 patients with gangrene of a cold-injured part. It was of interest that no patients in this group were treated by a physician at the time the extremity was frozen. When medical treatment was initiated, thawing had apparently taken place, and edema, blister formation, discoloration, and impending gangrene were the principal problems. In general, the patients had initiated self-treatment by permitting the part to thaw or warm at room temperature, by applying cold to the involved extremity, or by plunging the frozen or cooled part into warm water. The impression was that those patients who applied rapid warming fared somewhat better because their tissue necrosis was the least extensive.

Pathogenesis. Mammalian tissue, when subjected to prolonged freezing and then thawed is seriously injured and is characterized by various types of tissue necrosis. These changes have been described as involving skin, nerve, muscle, and osseous tissue. In addition, a wide variety of vascular lesions has been recorded including intravascular thrombosis, nonspecific segmental arteritis, and lesions resembling endarteritis obliterans.

The variety of vascular effects resulting from freezing has led many authors to consider that circulatory effects are the cause of tissue injury resulting from frostbite. Others have discounted the vascular etiologic theory. They have pointed out that in some frostbite experiments tissue injury has been observed 15 minutes after freezing, while in experiments dealing with ischemia, a period of 3 or 4 hours of total arterial occlusion has been necessary before tissue injury was noted. To some, this suggests that frostbite is essentially a thermal type of injury and is comparable to a burn.

Meryman and associates have made the observation that clinical frostbite is a slow freezing process with ice crystals developing exclusively from available water in the extracellular compartment. Under these conditions, a hypertonic solution gradually forms about the cells producing a local type of tissue dehydration with the cells collapsing between the ice crystals. The degree of cellular injury is progressive and proceeds with the time-temperature relation. Meryman emphasizes that tissue injury occurs primarily during freezing; once thawing has taken place, vascular changes represent a complication of frostbite and are similar to vascular changes associated with other forms of tissue trauma.

Treatment. Treatment of acute frostbite has been primarily concerned with the effect of rapid thawing, slow thawing, or application of cold on final tissue survival. In general, the great bulk of data indicates that cold has little therapeutic value and should not be employed; that rapid warming of the frozen part in a water bath at 43° C (110° F.) is the most satisfactory method

of management. The effectiveness of rapid thawing as a therapeutic procedure appears to be related to the shortening of the time during which the frostbitten tissue is exposed to a cold environment.

It is apparent that in frostbite there exists an extremely narrow zone between tissue survival and tissue death; and, in terms of organ resistance, skin is less susceptible to freezing injury than is muscle while blood vessels and nerve tissue are intermediate. If it is considered that frostbite is a type of tissue injury, removal of the causative factor is fundamental in early management.

Therapeutic measures other than rapid warming have been employed, such as heparin, rutin (to lessen capillary fragility), antihistamines (histamine is presumably present in the cutaneous blebs of frostbite), cortisone (to counteract the inflammatory reaction), systemic use of vasodilators, and surgical sympathectomy. In many experimental studies, tissue survival has been reported as enhanced by each of these agents and methods of therapy; in others, controversy exists as to their usefulness. During the Korean conflict, results with heparin, cortisone, and vasodilators were not encouraging.

If rapid thawing at 43° C. (110° F.) is to be employed clinically, it must be used for a frozen extremity or one in which thawing has just commenced. Once thawing has taken place—and is complete—rapid warming is contraindicated; the main problem at this point is that of ischemia resulting from intravascular thrombosis. Treatment at this stage should be directed to maintenance of circulation and prevention of further tissue injury according to present concepts of wound healing.

One factor deserves emphasis—the fact that both patient and physician frequently look upon frostbite as a relatively minor injury, and only after unmistakable signs of tissue necrosis become evident is the seriousness of the injury realized. To prescribe bed rest as a necessary form of therapy to prevent further trauma is appropriate—principally when the feet are involved.

If heparin is to be employed to its fullest theoretical potential, it should be administered before intravascular thrombosis has taken place. With respect to systemic vasodilators, hypotension frequently follows their administration. When this occurs, the blood flow to an already ischemic area is reduced. Therefore, their use may be harmful. Data concerning use of sympathectomy early in acute frostbite are inconclusive.

It is quite apparent that management of frostbite according to contemporary methods is inadequate. Current concepts of immediate treatment of frostbite deserve reconsideration because rapid thawing has been shown in experimental studies to offer considerable benefit with respect to preservation of tissue. It would seem practical to instruct persons in the rapid warming technique when their occupations and geographic environment make them susceptible to frostbite. In like manner, members of police forces, ambulance personnel, and those whose work may indirectly bring them into contact with frostbite should also be instructed in the fundamentals of rapid thawing and

recognition of the inherent difference between frostbite and nonfreezing cold injuries. (Phelan, J.T., Frostbite: J. Internat. Coll. Surg., 32: 501-509, November 1959)

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Antepartum Hemorrhage

Management of hemorrhage during the last trimester of pregnancy constitutes one of the most important and controversial obstetrical problems. Presenting his attitudes toward this problem, the author reviews 552 instances of such occurrences at the hospital of his practice.

ABRUPTIO PLACENTAE

During the 14-year period from 1944 through 1957 there were 41,919 deliveries at the hospital; among these, 383 patients had premature separation of the normally situated placenta after the 28th week of pregnancy, representing an incidence of one such complication in 109 deliveries.

While hypertensive toxemia of pregnancy and hypertensive cardiovascular disease were found in only 8.8% of the patients, in many of whom there was no elevation of blood pressure or proteinuria, abnormal gain in weight and edema strongly suggested presence of toxemia. Preexisting hypertension in others may have been masked by a fall in blood pressure incident to hemorrhage. Direct trauma to the uterus is known to produce retroplacental hemorrhage. However, in the author's series, only one patient presented with trauma as a possible causative factor for hemorrhage.

Symptomatology. Constitutional symptoms of the mother usually were in direct proportion to the amount of hemorrhage. Severe hemorrhage most often occurred before onset of labor and bleeding was more frequently concealed for a comparatively long period.

Fibrinogenopenia is associated with abruptio placentae in a sufficient number of cases to require determination of the level of fibrinogen in each suspicious case. Presumably, absorption of thromboplastin from the retroplacental area initially produces intravascular coagulation of fibrin and later a critical fall in available fibrinogen; this results in absence of deficiency of clot formation. The author has encountered four such patients in the past 5 years.

Three-fifths of the separations occurred during labor and did not constitute the greatest hazard. Mild cases were those occurring—almost without exception—during labor, and were manifested by somewhat more than usual bleeding, some increase in uterine tension, and, occasionally, by evidence of slight or moderate fetal distress. Severe instances were those in which there was evidence of a large concealed or frank external hemorrhage.

Management. Choice of management is dependent upon severity of symptoms, presence or absence of good clot formation, condition of the fetus, status of labor, and—most important of all—degree of cervical effacement and dilatation.

In instances in which separation occurred in the course of labor, usually little more was necessary than administration of oxygen and increased caution of the obstetrician. In the author's series, more than two-thirds were delivered vaginally.

In more severe examples—particularly those with separation before onset of labor—cesarean section is more often the method of delivery. Not until the uterus is empty can firm contraction of the uterus close the bleeding sinuses at the placental site. Three-fifths of 161 such occurrences were managed by cesarean section.

In more urgent cases, cesarean section occasionally is done in the interest of the mother even though the child is known to be dead. Before instituting any procedure for delivery, the patient must be treated for shock. While necessary preparations for cesarean section are awaited, the membranes are ruptured to decrease absorption of thromboplastin and to hasten labor. Under these circumstances, rapid dilatation of the cervix often obviates the need for cesarean section. A fine point of judgment is required in determining how long to postpone operative measures while reaction from shock is awaited. No arbitrary rules can be stated because each patient must be considered according to prevailing circumstances.

The uterus is not removed simply because of its darkened and contused appearance from extravasation of blood, only when it fails to contract after evacuation.

Following delivery, postpartum hemorrhage may be a problem and a small amount of additional bleeding may be tolerated poorly by the patient who already has suffered a considerable loss of blood. Administration of oxytocin in dilute solution intravenously following delivery has lessened the incidence of hemorrhage.

Mortality. Maternal mortality was 0.26%—one patient out of 383 cases. This occurred following vaginal delivery, presumably due to amniotic fluid embolism.

Since many of the babies were dead in utero at time of admission to the hospital and 40 babies weighed less than 4 pounds, the uncorrected mortality rate of 24.6% was less than had been anticipated.

Summary. (1) Mild degree—administration of oxygen and increased vigilance. (2) Severe—prompt evacuation of uterus as compatible with safety, particularly in those cases in which there is associated fibrinogenopenia. (3) Treatment of shock and replacement of blood before delivery. (4) Replacement of blood following delivery. (5) Precaution against postpartum hemorrhage.

PLACENTA PREVIA

During the 14-year period of the report, 169 cases of placenta previa occurred. Strict criteria for making the diagnosis were followed with an incidence of one in 248 deliveries. Low implantation without actual encroachment on the internal os was the degree most commonly encountered.

Management. Choice of treatment is dependent upon severity of hemorrhage, degree of shock, likely viability of the child, location of placenta, presentation, and amount of cervical dilatation.

The author adopts the so-called expectant treatment. Patients who present this complication prior to the 38th week of pregnancy are treated expectantly unless the bleeding is alarming in amount or duration. In most instances, the first bleeding will cease spontaneously if the patient is kept in bed. Vaginal examination except by speculum is avoided. Because of the tendency of subsequent hemorrhages to be increasingly profuse, expectantly managed patients should remain in the hospital until delivered.

If bleeding occurs during labor, if the placenta is marginal or lateral, and if presentation is polar, rupture of the membranes often will allow the presenting part to make sufficient pressure on the partly separated and traumatized placenta to control bleeding. Traction on the scalp occasionally is advisable. In such instances, labor is allowed to proceed to spontaneous or low forceps delivery. If the cervix is completely dilated and the baby is small, version and extraction on rare occasions may be the procedure of choice except in the presence of central implantation. Because of the danger that deep laceration of the cervix may extend into the placental site, manual dilatation of the cervix is strictly contraindicated.

Following these principles, 51 (30.1%) of the author's series were delivered by the vaginal route. In 118 (68.9%), cesarean section was performed. If bleeding is profuse and the cervix is closed, if there is central location of the placenta, or there is malpresentation, the latter procedure is mandatory.

Mortality. No maternal mortality occurred in the series presented. There were 19 infant deaths of 171 occurrences of placenta previa for a rate of 11.1%. Intrauterine asphyxia presumably was responsible for most of the fetal deaths and was contributory cause in all. Prematurity was the next most frequent factor.

Summary. (1) Accurate diagnosis of cause of bleeding. Cautious examination in delivery room with a speculum is indicated. (2) Expectant management in the hospital when possible. (4) Rupture of membranes when cervix is dilated. (5) Manual dilatation of the cervix and forcible vaginal delivery are contraindicated. (6) Use of hydrostatic bag is condemned. (7) Cesarean section in instances of central placenta previa, malpresentation of fetus, and undilated cervix. (8) Oxytocin by continuous intravenous drip immediately following delivery. (Kimbrough, R.A., Antepartum Hemorrhage: Am. J. Obst. & Gynec., 78: 1161-1168. December 1959)

Poststreptococcal Nephritis

Uncertainties and disagreements still complicate consideration of diseases that affect primarily the glomerulus. Although specific therapy is not at hand, accurate classification and clear concepts of the natural histories of these diseases contribute significantly to their understanding, practical clinical management, and prognosis.

Acute glomerulonephritis develops several weeks after a streptococcal infection. Some cases of nephritis are so mild that they can be detected only by careful serial examinations of the urine. In a few patients, the disease is severe enough to cause death in the acute phase, or it becomes progressive with death in a year or so. However, the majority of patients soon improve and many heal completely. Second attacks are extremely rare among healed patients, even after proved streptococcal infections. The remaining patients—despite improvement—continue to have proteinuria, and are classified as chronic latent glomerulonephritis. Exacerbations similar to the initial acute attack occur in approximately 20% of these, and usually follow another streptococcal infection. Whether or not exacerbations develop, renal function gradually deteriorates, causing uremia and death after 5 to 30 years. Some patients develop the nephrotic syndrome, but this should not be considered an exacerbation in the true sense. However, all instances of nephrotic syndrome or of clinical chronic nephritis do not necessarily represent poststreptococcal chronic glomerulonephritis.

The keystone of the authors' approach to the problem was a correlation of clinical course with serial histologic observations in 36 adults with sporadic acute glomerulonephritis whose disease followed proved hemolytic streptococcal infection. Detailed analyses were completed in 32 of the group.

Sixteen patients healed clinically as evidenced by permanent disappearance of proteinuria, while 16 improved but did not heal. Half of each group had gross hematuria. However, a greater incidence of edema, hypertension, and definite nitrogen retention were noted among those whose disease failed to heal. In general, the more severe the clinical syndrome in adults, the less likely is healing. This is in contrast to observations in children and in epidemics among young adults in military camps where more than 95% exhibit apparent recovery.

Among the 16 patients whose disease healed, definite glomerular hypercellularity was found in all glomeruli of 13, while 2 had equivocal and one had no hypercellularity. Even severe glomerular hypercellularity can be followed by healing, provided other glomerular damage does not develop. Glomerular hyalinization, crescents, lobular necrosis, or scarring were found in 13 of the 16 patients whose disease became chronic. One hundred and thirty of 377 glomeruli in this group were so involved. Five of the 16 patients whose disease healed clinically had similar but generally milder and less frequent

changes. In the healed group 25 of 339 glomeruli were so involved. Red blood cell or heme casts in the tubules of those who became chronic also were more common than in those whose disease healed. Diffuse interstitial fibrosis or moderately severe focal fibrosis was commonly found in patients whose nephritis became chronic, while in general such changes were less frequent in the healed group.

All instances of acute nephritis are not associated with hemolytic streptococcal infections. Either focal or diffuse glomerulonephritis can complicate subacute bacterial endocarditis. Acute glomerulonephritis has been described following pneumococcal pneumonia, but the possibility of associated streptococcal infections was not rigorously excluded. During the winter of 1956, the authors studied 10 patients at Great Lakes Naval Hospital with acute hemorrhagic nephritis in whom adequate study revealed no evidence of recent streptococcal infection. The nephritis was mild and prompt recovery the rule. These attacks followed pharyngitis which appeared to be viral in origin. Renal biopsies revealed focal glomerular hemorrhage but no hypercellularity. Other nonstreptococcal etiologies of clinical acute nephritis undoubtedly exist.

Consideration of chronic renal disease is less satisfactory because the time of onset is rarely certain, etiologic clues are few, and the same histologic pattern may occur in different diseases. In the experience of the authors, characteristic patterns were noted to emerge. In all but 8 of 37 patients with chronic diffuse proliferative glomerulonephritis on biopsy, the disease followed acute nephritis of proved or probable streptococcal origin.

Of a series of 109 patients with chronic proteinuria, the largest group was the 37 patients with chronic diffuse proliferative glomerulonephritis. Of this group, 9 developed the nephrotic syndrome which occurs in various renal diseases. Renal biopsy revealed 5 patients to have normal glomeruli by ordinary light microscopy; 4 others had diffuse thickening of the glomerular capillary basement membranes. A similar but focal process was noted in 6 patients, while focal proliferative changes, occasionally associated with focal membranous changes, occurred in 18 patients. Of the latter, 3 had systemic lupus erythematosus; 2 had diffuse arteritis. Study in other patients revealed normal kidneys except for tubular hyaline droplets or interstitial fibrosis; or, mild arteriolar changes. In 16 patients, lesions of Kimmelstiel-Wilson disease, renal vein thrombosis, amyloidosis, pyelonephritis, or arteriolonephrosclerosis were seen.

These data emphasize the point that many patients with chronic proteinuria and other clinical evidence of chronic nephritis, but with indefinite relation to streptococci, may have various histologic lesions other than those of chronic diffuse proliferative glomerulonephritis of streptococcal etiology. All forms of glomerulonephritis are not manifestations of the same disease. (Earle, D.P., Jennings, R.B., *Studies of Poststreptococcal Nephritis and Other Glomerular Diseases: Ann. Int. Med.*, 51: 851-860, November 1959)

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Status of Tuberculosis

The present status of tuberculosis, responsible for 100 million days of illness annually in the United States, was discussed at the 1959 meetings of the National Tuberculosis Association, the American Trudeau Society, and the National Conference of Tuberculosis Workers. Reports and items of discussion included:

Airborne Transmission. Study strengthened the case of airborne transmission, indicating that droplet nuclei are the source of infection when air exhausted from a tuberculosis ward is breathed by test animals. Disinfecting the upper air of rooms with ultraviolet light appeared to block transmission of influenza virus according to one group of investigators, but this principle was not applied on tuberculosis wards.

Race and Environment. In a similar environment, response to tuberculosis of Negro and Caucasian was similar, and racial factors probably played a minor role in producing differences in tuberculosis morbidity and mortality. No special susceptibility to tuberculosis was found among the Labrador Eskimos and Indians. The high tuberculosis death rate in the latter groups was attributed to inadequate control measures and environmental factors such as overcrowded homes, poverty, poor hygiene, and malnutrition.

Case Finding. Active primary tuberculosis was found in 158 children whose disease would have been missed without thorough checking by the family contact investigation service of one clinic. None showed signs of ill health which would have prompted parents to seek medical examinations for these children.

Another group stressed that if tuberculin tests are substituted for roentgen examination of pregnant patients, significant nontuberculous disease in nonreactors may be missed.

BCG Vaccination. A 20-year study showed a statistically significant difference in the number of cases of tuberculosis among infants who received BCG vaccinations and control subjects.

New Techniques. Promising new techniques, a diagnostic blood test for tuberculosis, and two rapid simple methods of detecting viable tubercle bacilli in sputum were described by various investigators.

One group developed a serum gel diffusion test. An agar suspension of tubercle antigen at the bottom of the test tube with a covering layer of pure agar receives the patient's serum. Acid-fast antibodies diffuse toward the center of the tube, forming a precipitation ring when fixed by the test antigen. Accuracy of this test has been encouraging when applied by different centers.

A mouse test to detect tubercle bacilli in sputum and gastric lavage specimens failed only once in 362 clinical trials and is much faster and more sensitive than conventional procedures. In this test, a portion of the concentrate from the specimens, together with hog gastric mucin, was injected intraperitoneally into four mice. The animals were sacrificed at 5, 10, 15, and 20 days and studies made.

A new 5-day slide culture technique tested on 100 sputum samples was 98% successful compared with 69% when the conventional method was used. For the test, the researchers developed a new mucolytic and proteolytic enzyme which liquefies sputum more efficiently and is less toxic to acid-fast organisms. After a 5-day incubation period, coverslip samples were treated with a modified Hanks' differentiating acidfast stain, permitting superior microcolonial differentiation of acidfast micro-organisms even under low magnification.

Other Lung Diseases. Despite thorough safety precautions, laboratory personnel working with the causative agents of psittacosis and Q fever occasionally became infected. As observed by one group, the illnesses were somewhat milder than in the case of naturally acquired infections.

According to the administrator for research on lung cancer of the American Cancer Society, several attitudes toward the relationship between smoking and lung cancer prevail. These attitudes can be categorized on five levels of decision—intuition, clinical judgment, epidemiologic evidence, pathogenetic evidence, or "proof positive." The present status of knowledge falls short of definitive proof, but the evidence is sufficiently impressive to satisfy most observers. (Status of Tuberculosis (Conference Report): Pub. Health Rep., 74: 1001-1008, November 1959)

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Rheumatoid Factors

The term rheumatoid factors has been applied to a class of closely related proteins that are responsible for a variety of serologic reactions currently employed for the diagnosis of rheumatoid arthritis. A marked intensification of interest in these factors has developed during the past 2 years, primarily because there is an intuitive feeling that they may represent a clue to the etiology of rheumatoid arthritis. It now appears that they probably represent antibodies, possibly autoantibodies.

Evidence that these factors are involved in a direct causative manner in the joint lesions of rheumatoid arthritis is extremely scant. Their occurrence in a wide variety of disorders other than rheumatoid arthritis, although at a lower incidence, argues against such a concept. However, a certain amount of indirect evidence has been accumulated suggesting that rheumatoid factors may contribute to some of the secondary manifestations of rheumatoid arthritis.

Serologic Tests. A large number of different serologic tests are currently employed for diagnostic purposes. The sensitized sheep cell agglutination reaction, one of the oldest, now appears to be one of the most specific. However, it lacks the sensitivity of some newer tests, such as latex fixation and bentonite flocculation which are now widely used. These are relatively simple procedures, but their sensitivity is gained at the expense of an increase in positive results in such conditions as liver disease, sarcoidosis, and parasitic infections.

Because these conditions can frequently be diagnosed by other means, this does not necessarily represent a serious disadvantage. Another reaction that is beginning to be used is the Rh sensitized human cell test. Also, there is a group of inhibition procedures that seem to be sensitive with positive reactions in as high as 95% of patients with rheumatoid arthritis.

The mechanism of all these reactions is basically similar and appears to be relatively straightforward. Gamma globulin or antibody coats red cells or particles which are then secondarily agglutinated by the rheumatoid factors. They all depend on the specific affinity of the rheumatoid factors for gamma-globulin or for gamma globulin coating a surface. This has led to the concept that these factors may be antibodies to gamma globulin. The different reactions are similar but not identical, and it is clear that a number of different rheumatoid factors are involved.

Inhibition procedures depend on lack of an inhibitor of the standard tests in rheumatoid arthritis sera which is present in normal serum. Presumably, the inhibitor is neutralized by small amounts of inherent rheumatoid factor.

Isolation and Properties. The leading recent development concerning rheumatoid factors has been their isolation with resultant understanding of many of their properties. Isolation work has added further weight to the concept that these factors represent antibodies. They appear similar to such antibodies as certain of the isoagglutinins, cold agglutinins, saline Rh agglutinins, and many others.

If the rheumatoid factors represent antibodies, what is the antigen involved? This remains an enigma, although some evidence suggests that they might be antibodies to ordinary gamma globulin or anti-antibodies. The suggestion has been made that the rheumatoid factor might represent antibodies to hypothetical antigen-antibody complexes.

One of the most interesting features of the rheumatoid factors is that they appear to circulate in the blood stream in the form of a complex. The question, of course, again comes up as to whether this complex represents a circulating antigen-antibody complex. The evidence from association and reassociation experiments is suggestive but not conclusive.

Interaction of the rheumatoid factors with the patients' own gamma globulin to form complexes suggests the possibility that they represent auto-antibodies. The evidence for autoantibodies to nuclear and cytoplasmic constituents of cells in the closely related disease, lupus erythematosus, is considerable, and makes such an autoantibody hypothesis in rheumatoid arthritis more tenable.

Another somewhat different aspect of rheumatoid arthritis in which the rheumatoid factors promise to play an important role is its genetic distribution. An ever increasing number of students of this disease are impressed with the dominant role of heredity in this condition. There appears little doubt that asymptomatic relatives of rheumatoid arthritis patients show a higher incidence of positive serologic reactions than control groups.

Various workers have been impressed with the analogy between the rheumatoid factors and the Wassermann and related antibodies in syphilis. These, too, are thought by some to be autoantibodies produced through tissue destruction as a result of spirochetal infection. This analogy may be raised as support for the concept that unknown infectious agents might be the cause of rheumatoid arthritis, and that the rheumatoid factors represent red herrings of misleading pathogenic significance.

Ignorance is obviously profound concerning the etiology of rheumatoid arthritis, despite the isolation and characterization of the rheumatoid factors. Their study has represented a grasping at straws in this disease with no guarantee that even a clue to etiology will be obtained. However, irrespective of what role—if any—the rheumatoid factors play in this disorder, it is apparent that the proteins involved are of considerable general interest, particularly from the immunologic standpoint. (Kunkel, H.G., *The Rheumatoid Factors*: A.M.A. Arch. Int. Med., 104: 832-836, November 1959)

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Policy

The U.S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Change of Address

Please forward requests for change of address for the News Letter to: Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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Present Status of Medicare

As a result of comprehensive review of the operation of the dependents' medical care program under the changes effected 1 October 1958, the Secretary of Defense approved restoration of certain medical and surgical services from civilian sources on and after 1 January 1960. The services restored include:

(1) In addition to treatment of acute surgical conditions, treatment of nonacute surgical conditions when medically indicated and when surgery is required for proper treatment of the condition. This treatment is authorized only during hospitalization.

(2) Necessary diagnostic tests and procedures ordered by the attending physician before and after hospitalization of the dependent for treatment of a bodily injury or surgical operation. These procedures are authorized only in direct connection with the injury or surgery for which hospitalized.

(3) Treatment in a hospital of acute emotional disorders constituting an emergency which is a threat to the life or health of the patient. Payment authorized only until disorder subsides, until arrangements are made for care at other than Medicare expense, or until end of 21 days of hospitalization, whichever occurs earliest.

(4) Outpatient care and treatment of bodily injuries—fractures, dislocations, lacerations—including necessary diagnostic tests and procedures ordered or performed by the attending physician in treatment of the injuries.

Restriction on "free choice" between uniformed services medical facilities and civilian medical facilities for spouse and children living in the area to which their sponsor is assigned remains in effect. These dependents may be authorized civilian medical care only when service medical facilities are not available in the area in which they reside, or service facilities which are available cannot provide the required care. In these cases, appropriate service commands have authority to issue a Statement of Nonavailability (Dependents' Medical Care Program) DD Form 1251 to eligible dependents, permitting them to seek the authorized medical care from civilian sources.

Changes in the dependents' medical care program are expected to have little or no effect on the present dependent workload at service hospitals. On the other hand, the service hospital may issue Nonavailability Statements when they are unable to provide the required care because of lack of space or staff.

In issuing the new directive implementing the changes, SECNAV Instruction 6320.8A, all commands have been requested to keep members of their command informed on the several aspects of the dependents' medical care program. This should be helpful in getting information to the dependents and in administering the program.

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Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget (19 June 1958).

Directives

At times attention is invited to directives of general concern. For economy of space, they are briefly described. Complete copies usually are available at local Administrative or Personnel Offices. When not available locally, copies may be obtained from Navy Supply Center, Oakland, Calif., or Norfolk, Va., or Supply Dept., Naval Weapons Plant, Washington 25, D.C.

SECNAV INSTRUCTION 6320.8A

16 December 1959

Subj: Dependents' medical care

This Instruction promulgates the joint Army-Navy-Air Force-Public Health Service regulation which prescribes the policies and procedures for administering the medical and dental care program for dependents of the uniformed services; cancels and supersedes previous directives concerning this program. (See article, page 18, Medical News Letter)

BUMED INSTRUCTION 1510.10

21 December 1959

Subj: Training of Group X hospital corpsmen as technicians

The purpose of this Instruction is: (1) to promulgate information relative to training requirements for hospital corpsmen; (2) to encourage additional applications for technician training; and (3) to request commanding officers of naval hospitals to institute on-the-job training to fill vacant technicians' billets within their commands.

BUMED INSTRUCTION 1520.12A

5 January 1960

Subj: Medical Service Corps training program

This Instruction sets forth the objectives, operating principles, and administrative details of the Medical Service Corps training program and tabulates eligibility requirements and curriculums available. It pertains to full-time and part-time training sponsored by the Bureau in service facilities and civilian educational institutions.

BUMED INSTRUCTION 6250.8

30 December 1959

Subj: Shipboard pest control training program

This Instruction provides a standard training program for personnel assigned responsibilities in, or related to, pest control aboard ship.

Advanced Course in Nuclear Science

Location: University of Rochester, Rochester, N. Y.

Duration: 1 year

Convening date: 12 September 1960

Security Clearance: TOP SECRET (at beginning of course)

Deadline for applications: 15 March 1960

Objective. The course affords an opportunity to obtain the degree, Master of Science in Radiation Biology (M. S.), and is preparation for assignment to the Nuclear Propulsion Program of the Navy, or duties involving medical problems of ionizing radiation, such as radiation safety programs and special weapons effects.

Itinerary. The major portion of the course involves didactic training in radiation biology, with the course being divided into four phases:

Phase I Radiation Biology - University of Rochester Atomic Energy Project, School of Medicine and Dentistry, University of Rochester, Rochester, N. Y., 12 September 1960 - 10 June 1960.

Phase II Nuclear Reactor Orientation - Idaho Operations Office, A. E. C., Idaho Falls, Idaho, 19 - 21 June 1961.

Phase III Military Medical Aspects - (1) Nevada Test Site, 26 - 28 June 1961; (2) Sandia Base, Lovelace Clinic and vicinity, 3 - 21 July 1961; (3) Los Alamos Scientific Laboratory, 17 - 21 July 1961.

Phase IV Medico-Military Applications - (1) National Naval Medical Center, Bethesda, Md., 31 July - 18 August 1961; (2) Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D. C., 21 August - 23 September 1961.

Eligibility. A class quota of 12 has been assigned, with a limit of 4 each from the Army, Navy, and Air Force. Requests for attendance are invited from Medical Corps or Medical Service Corps officers of the Regular Navy; and Medical Corps or Medical Service Corps Reserve officers who are on active duty and are eligible to apply for, and be accepted for, appointment in the Regular Navy. All applicants must meet the admission requirements of the University of Rochester.

Applications: Interested officers may submit a letter of request via the Commanding Officer, to reach the Bureau of Medicine and Surgery (Attn: Code 316), Department of the Navy, Washington 25, D. C., prior to 15 March 1960.

Recent Research ReportsNaval Medical Research Institute, National Naval Medical Center,
Bethesda, Md.

1. Sea Water Radiological Monitoring Methods. NM 62 04 00.04.01.
13 March 1959.
2. New Type of Transmissometer, Memorandum Report 59-2. NM 18 01
00.02. 25 May 1959.
3. Responses of Acetylcholinesterase and Conduction in Bullfrog Sciatic
Nerve to the Stereochemistry of Aminoalcohol Derivatives. III. NM 02
02 00.01.04. 28 May 1959.
4. Some Observations on the Effect of Heat on the Testicular Germinal
Epithelium. NM 01 02 00.03.03. 19 June 1959.
5. Spontaneous Rewarming of the Hypothermic Curarized Dog. NM 41 02
00.01.02. 19 June 1959.
6. Polynucleotides X: The Interaction of Polyribonucleosinic and Polyribo-
adenylic Acids. NM 02 01 00.01.10. 1 July 1959.
7. Radiationless Migration of Electronic Excitation in Retinal Rods.
NM 04 01 00.03.01. 7 July 1959.
8. Anorganic Bone Grafting. A Preliminary Report of Clinical Experiences
with Heterografts Processed by Ethylenediamine Extraction. NM 71 01
00.06.03. 10 July 1959.
9. X-Ray Analysis of Rapidly Frozen Gelatin Gels. NM 71 01 00.07.02.
10 July 1959.
10. The Morphology and Behavior of Living Exoerythrocytic Stages of
Plasmodium Gallinaceum and P. Fallax and Their Host Cells. NM 52 01
00.02.03. 10 July 1959.
11. Sublimation Freeze-Drying Without Vacuum. NM 71 01 00.07.03.
10 July 1959.
12. The Growth of Exoerythrocytic Stages of Avian Malaria Within Diffusion
Chambers in Different Hosts. NM 52 01 00.02.04. 10 July 1959.
13. Heat Stress During Operation Banyan Tree. A Preliminary Report.
NM 41 01 00.01.02. 16 July 1959.
14. Effect of pH on the Twitch Facilitating Potency of 3-Hydroxyphenyltri-
ethylammonium ion. NM 72 02 00.02.05. 21 July 1959.
15. Rapid Extracorporeal Hypothermia. NM 71 03 00.01.03. 6 August 1959.
16. Elective Cardioplegia by Local Cardiac Hypothermia. NM 71 05 00.04.01.
7 August 1959.
17. Dendritic Current Distribution and Whole Neuron Properties. NM 01 05
00.01.02. 7 August 1959.
18. Acquired Distinctiveness and Equivalence of Cues in Psychophysical
Judgments. Memo Report 59-3 related to NM 15 01 00.01. 14 August 1959.

(To be continued in an early issue)

From the Note Book

Army Citation to CDR Jachowski. At a recent ceremony at the National Naval Medical Center, Bethesda, Md., CDR Leo A. Jachowski MSC USN, member of the staff of the Naval Medical Research Institute, was presented the Army Citation and Commendation Ribbon with Metal Pendant for meritorious service rendered while on duty at the U.S. Army Tropical Research Medical Laboratory, San Juan, Puerto Rico. In 1952, CDR Jachowski was the recipient of "The Bailey K. Ashford Award in Tropical Medicine" awarded by the American Society of Tropical Medicine, and in 1959 the Puerto Rican Bilharzia Committee awarded him "The Isaac Gonzales-Martinez Award." (NNMC Release)

Mediastinal Masses. The authors present a study of 782 cases of mediastinal masses of which 42% were histologically malignant, and many others were life endangering because of size or position. Steps for making diagnosis are outlined and when all other measures fail, they considered thoracotomy mandatory. In their experience, thoracotomy has a low case fatality rate, offers cure in benign lesions, and gives accurate information on which intelligent management can be based. (H. Lyons, CAPT G. Calvy MC USN, LCDR B. Sammons MC USN: Ann. Int. Med., November 1959)

"Little Strokes." Importance of prompt diagnosis and early inception of treatment is stressed in "Little Strokes: Hope Through Research." This is a newly published Public Health Service booklet prepared by National Institute of Neurological Diseases and Blindness and which reviews research currently being conducted at, or sponsored by, the Institute. Identified as PHS Publication No. 689, single copies are obtainable gratis upon request to the Institute in Bethesda 14, Md. (Washington Report on the Medical Sciences, December 21, 1959)

Five-Minute IV Pyelogram. Utilizing intravenous urography for determination of renal function, the author concludes that satisfactory renal function may be assumed if the density of the contrast medium within both renal pelvises on the five-minute intravenous pyelogram exceeds the roentgenographic density of the ribs. (M. Woodruff: Am. J. Roentgenol., November 1959)

Asian Influenza and Pregnancy. In Minnesota during 1957 and 1958, Asian influenza accounted for more maternal deaths than any other cause and for 19.2% of the total. Of deaths from Asian influenza among women of child-bearing age, 50% occurred in pregnant women. Deaths were characterized by fulminating and overwhelming edematous pneumonia with respiratory insufficiency, in contrast to deaths in nonpregnant individuals where secondary

bacterial infections accounted for a large proportion. The value of routine use of influenza vaccine is stressed, in addition to serious attention to prevention and vigorous treatment of pulmonary edema in pregnant women who suffer from influenza. (D. W. Freeman, et al: Am. J. Obst. & Gynec., November 1959)

Tranquilizing Drugs. The Combined Staff Clinic on Tranquilizing Drugs in the November American Journal of Medicine presents a symposium representing the current opinions of several authorities in the field of employment of the tranquilizing drugs.

Vaginal Candidiasis. Results with a new antimonilial agent, 3-trichloromethylthio-5-(1-ethyl) amyl hydantoin, indicate that it is an effective agent for treatment of this common monilial infection. (B. Lapan: Am. J. Obst. & Gynec., November 1959)

Hodgkin's Disease and Intelligence. Evidence has been accumulating in recent years that certain correlations exist between factors generally regarded as psychological and the development of neoplastic disease. Studying 209 patients with the diagnosis of Hodgkin's disease, the authors offer no interpretations, but point out that the mean AGCT score for 97 such patients was significantly higher than that for the Army population mean. (L. LeShan, Ph. D., et al: A.M.A. Arch. General Psychiatry, November 1959)

Griseofulvin. Articles in the Journal of the American Medical Association for 19 December 1959 describe (a) use of griseofulvin for systemic treatment of dermatomycoses, and (b) toxicologic studies and effectiveness of griseofulvin in dermatomycosis. Therapeutic effectiveness seems to be of encouraging high degree and toxic effects of gratifying low degree.

Alcoholism and Cirrhosis. The authors consider that alcoholic hyaline degeneration and lytic necrosis of hepatic cells are more important factors than fatty change in production of damage to reticulin framework of the liver and in prevention of normal intralobular regeneration. From their observations, hepatic cellular necrosis is conducive to development of cirrhosis. (R. Shorter, A. Baggenstoss: Am. J. Clin Path., November 1959)

Test for Pregnancy. A preliminary report of an electroplating test for detection of pregnancy is described with indications that complications of pregnancy, such as threatened abortion, are accompanied by changes in the test, suggesting that it may be a valuable tool not only for detecting pregnancy, but also for following the course of gestation. (W. H. Hartung, Jr., H. G. DeVautent: Am. J. Obst. & Gynec., November 1959)

DENTAL**SECTION**

Metabolic Factors in Caries Rampant
and Caries Immune Saliva

Previous investigations have demonstrated that there is a highly significant difference between oxidation of certain substrates by saliva of caries-rampant as compared to that of caries-immune subjects. Saliva of the caries-rampant group exhibited a higher rate of metabolic activity. In the present study, saliva samples from 25 caries-rampant and 25 caries-immune subjects were separated into various components in order to determine if any one part could be responsible for these characteristic metabolic reactions. The endogenous respiration and oxidation of glucose and lactate by these various fractions were measured using conventional manometric techniques. The respiration rates of supernatant fluid from centrifuged whole saliva, pure parotid secretions, and washed salivary sediments were compared to those of whole saliva.

In every instance, the metabolic activity recorded for each of these individual components was only a small fraction of that of whole saliva. When supernatant fluid from each sample was recombined with its own washed sediment, its metabolic activity was fully restored. The addition of caries-immune supernatant to caries-rampant sediment also restored the activity of that sediment to its normal value; however, addition of its autogenous parotid, or of caries-immune parotid secretions depressed its activity to the caries-immune level. The normal activity of caries-immune sediment was restored by addition of autogenous or caries-rampant parotid secretions, but was stimulated to the caries-rampant level of activity by addition of caries-rampant supernatant. (LCDR George H. Green DC USN, U. S. Naval Training Center, Great Lakes, Ill. J. Dent. Res., July - August 1959)

Public Relations

Although the day-to-day work of the Dental Corps may not appear to be as spectacular as that of the aviator who stars in an air show, the public

can be made to see that the physical well-being of the man who handles a million dollars worth of airpower is of vital importance. Moreover, the cumulative effect on the people at home of letters from men in the service and statements while on leave showing that their dental health receives continuing and careful attention is an invaluable source of good will.

An important means of carrying the story of the Navy to the public is dissemination of news of promotions, transfers, assignments, or honors and citations to the home towns of all individuals concerned. Commanding Officers and Senior Dental Officers are encouraged to initiate, prepare, and forward to the Technical Information Office of the Bureau of Medicine and Surgery, news accounts arising from the operation of dental clinics and departments. Development of a new technique or invention, publication of articles or books by staff members, adoption of a labor-saving suggestion, a visit by a prominent person, or participation by Dental officers as essayists or clinicians in civilian professional meetings—this list is merely a hint of the varied material that an alert service information officer can offer through the appropriate public information office to local newspapers.

In addition to public understanding and support, another benefit to be expected from an effective public information program is the enhanced morale of personnel who know that performance of high quality will be recognized and publicized. To this end, the Assistant Chief of the Bureau of Medicine and Surgery (Dentistry) and Chief, Dental Division urges all Dental officers to contribute newsworthy information of the many worthwhile activities and accomplishments of their respective commands. The Dental Section of the U.S. Navy Medical News Letter will publish selected material, and other accounts may be published by the Technical Information Office of the Bureau of Medicine and Surgery in the weekly release of BuMed news.

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Naval Officer Education

The Navy annually gains a wealth of new intellectual potential in newly commissioned officers. The more senior officers—particularly commanding officers—can do a great deal to help these new officers realize that many opportunities for higher education are still ahead of them. It has been noted repeatedly that in specific units where the commanding officer takes an interest in guiding and encouraging this young talent to augment their education, the end result is superior officer material. Greater attention must be given by commanding officers to young officers, and greater effort must be made to (1) encourage these young officers to continue to expand their intellectual horizons, (2) explore with them the possible fields in which they can plan post-graduate education, and (3) demonstrate unequivocally that the Navy is interested in helping all officers—young and not so young—in reaching a high level of educational attainment.

To exploit to the maximum the latent talents of young officers, it is requested that a special effort be made in the Fleet by all officers, particularly Commanding Officers, to encourage young officers—by example as well as by counsel—to seek higher levels of intellectual attainment by taking advantage of the many opportunities available in correspondence courses, in prescribed reading, attendance at open forums, and in postgraduate courses. It would be appropriate for Commanding Officers to make fitness report notations in the cases of those officers who are able, on a voluntary basis, to pursue postgraduate prerequisite studies or to engage in other broadening academic pursuits. (CNO News and Views, 9 November 1959)

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Elements of Discipline

Attitude and punishment are the major elements of discipline. The first is the more important aspect. A high state of discipline results from the right attitude on the part of all hands—a state of mind that makes them willing and eager to obey orders and determined to fight courageously. Most blue-jackets have—and have had—the right attitude as is shown by the fighting record of the Navy. It is the small percentage that seems to be always out of step that causes trouble.

In general, naval discipline is of two types: positive discipline, which obviates the necessity for punishment by preventing offenses; and negative discipline which is primarily based upon fear of physical pain, embarrassment, punishment, or loss of status. Punishment actually becomes necessary because of failure of discipline.

Theoretically, a perfectly disciplined military organization has no reason to use the military court, captain's mast, or punishment of any sort. Positive discipline is a stronger force than negative discipline and possesses far more virtue from an administrative point of view. It aims at development of the state of mind, or attitude that causes the individual or group to perform the proper acts with or without specific instructions. Each person must know his job thoroughly; therefore, training is one of the basic factors in positive discipline. Positive discipline is the preventive, whereas negative discipline is the cure. A smooth-running dental department depends more on competence and morale of personnel than on threat of punishment.

The following factors have been cited as being responsible for breakdown of discipline: lack of information—subordinates not kept informed of the problems involved or reasons for actions taken; lack of interest—seniors show little or no interest in their juniors; slackness—general slackness throughout the organization because of slackness on the commanding officer's part; instability—a feeling of insecurity and uncertainty because of senseless transfers of personnel, frequent alterations in daily routine, and continual changes in operating schedules.

There is great need for factual information. The Dental officer should inform his men of what is going on within the command. He should explain to his personnel why a given task must be accomplished and what method is to be used. He should inform them of all plans for future operations of the activity, subject, of course, to security restrictions.

The Dental officer should be alert to detect spread of false rumors; he can stop them by telling men the truth. He should build confidence and esprit de corps by passing along accounts of all successful operations of his activity, in particular, and the Navy in general. He should note the converse—that unless there is information being passed down to his subordinates, there will be very little coming up to him. When seniors do not inform their juniors, juniors will not feel a compulsion to call the attention of their seniors to items of interest that often may be of vital importance to the activity and to the Navy.

The Dental officer should seek to obtain and retain the good will of personnel serving under him. He should take an interest in helping every man to develop pride in himself, in his particular job, in the uniform he wears, and in the part he plays in the organization of the department and the ship.

The Dental officer should realize that recognition and acceptance by one's fellows are basic human needs. A man must be made to feel important to himself, and that he is relied upon by his shipmates and valued by those in authority. It is vital that he be made to understand that primarily he is serving the needs of the Dental Corps and of the nation, not those of the Dental officer.

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Dental Officers Participate in New York Meeting

Five U.S. Navy Dental officers recently participated in the Greater New York Dental Meeting held at the Hotel Statler Hilton, New York City. CAPT A. R. Frechette, Deputy Chief, Dental Division, Bureau of Medicine and Surgery, presented an essay, "Prosthetic Appliances Associated with Abnormal Jaw Relations," at the General Session, and a Registered Clinic on "Improved Partial Dentures." CDR J. D. Shaw, Naval Dental School, National Naval Medical Center, Bethesda, Md., discussed "Differential Diagnosis in Endodontics" and presented a clinic on "Endodontics in General Practice." CAPT L. S. Hansen and CAPT J. E. Flocken, also from the Naval Dental School, presented, respectively, a special report on "Biologic Response to High Speed Cutting Instruments," and a clinic, "Modern Impression Techniques for Fixed Prosthodontics." A clinical demonstration, "Complete Denture Equilibration," was presented by CAPT A. P. Leisz of the Naval Dental Clinic, Brooklyn.

RESERVE**SECTION****Military Medical Training Course**

A two-week active duty for training course in Military Medical Training will convene 14 March 1960 at the Naval Medical School, National Naval Medical Center, Bethesda, Md. (This course was previously scheduled to convene on 7 March 1960.)

The first week will be devoted to Medical Aspects of Special Weapons and Radioactive Isotopes with particular reference to personnel casualties from atomic explosions. The second week will be devoted to professional topics of concern to military medicine, including discussions on Reserve medical programs of the Armed Forces.

Naval Reserve Medical Department officer personnel are eligible for this course.

Messing facilities will be available; BOQ facilities will be limited on a first-come, first-served basis. Public lodging accommodations will be available locally in hotels, motels, and tourist homes. No security clearance is required. As this course has new subjects, new material, and has been revamped to bring it up to date, it is highly recommended for officers to repeat this training in the event they have participated in previous classes.

Quotas have been authorized to Commandants of the First, Third, Fourth, Fifth, Sixth, Eighth, and Ninth Naval Districts. Interested, eligible officers should submit requests for this training to their respective naval districts. Individuals who are Ready Reservists are eligible for active duty training with pay. Individuals who are Standby Reservists are eligible to participate in this training without pay.

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Official Correspondence, Reports, Mailing Address

Official Correspondence. Naval Reservists on inactive duty attached to, or associated with, a drilling unit shall forward official correspondence via their organization commander.

Reservists not attached to, or associated with, a unit shall forward official correspondence via their naval district commandant.

The foregoing does not preclude Reserve officers on inactive duty from reporting directly to the bureau or office concerned information which appears to be of special value or official interest. Officers performing outstanding services in this connection, upon recommendation of the bureau or office concerned, will be issued letters of commendation which will form a part of their official records.

Fitness Reports. These reports for Reserve officers shall be completed for the following types of training:

1. Active duty for training. Completed after periods of training with or without pay.

2. Inactive duty training. Annual fitness reports shall be submitted on officers attached to, associated with, or assigned to a paid drill unit or non-pay specialist unit. Also, fitness reports will be submitted on officers performing appropriate duty.

Annual Qualifications Questionnaire. Annually on 30 June upon receipt of the necessary forms from the cognizant commandant, each Naval Reserve officer on inactive duty shall complete and submit the annual qualification questionnaire in accordance with instructions promulgated by the Chief of Naval Personnel.

Mailing Address. This is defined as the address at which a member of the Naval Reserve can be reached quickly at any time by ordinary mail. A member of the Naval Reserve shall keep the cognizant custodian of his records informed of his mailing address. Changes of address should be reported as follows:

1. Officers. To commandant holding records. If affiliated with a pay unit, submit report via commanding officer of the unit.

2. Enlisted. To commanding officer when affiliated with a pay unit. To commandant holding records if not a member of a drill pay unit.

A temporary change of residence of six months or less does not require a transfer of records. However, if mail cannot be delivered promptly, the holder of your records should be notified of your address at the beginning and end of your temporary residence.

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New USNR Officer-WO Register

A new Register of Commissioned and Warrant Officers of the United States Naval Reserve was published on 1 January 1960. The previous edition appeared in 1955. A new feature of the Register is a table showing the relative precedence among officers by grade in the line and staff corps.

Officers selected for promotion are listed under their new ranks even though they had not accepted their appointment by the publication cutoff date of 1 July 1959. Their register numbers and dates of rank reflect relative precedence in the higher grade. Such listings are preceded by an asterisk.

Copies of the new Register will be distributed to all naval activities as soon as possible. Individual copies may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. (The Naval Reservist, December 1959)

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PREVENTIVE MEDICINE

Poliomyelitis Vaccination

At a one-day meeting on 4 December 1959, representatives of health and medical organizations were called to Washington, D. C., by the Public Health Service, Department of Health, Education, and Welfare, to review the 1959 polio experience and to map out ways of promoting further vaccinations before next summer.

According to new estimates announced by the Public Health Service, about 87 million Americans have now had at least one shot of polio vaccine and 68 million have had three or more injections.

Among persons under 40, over 34 million, or almost 30%, have had no vaccine. Among children under 5 years of age—the group that accounted for 43% of the paralytic cases this year—4-1/2 million have had no vaccine.

Data from a survey conducted by the Bureau of the Census for the Public Health Service in September supplemented with data from the National Foundation, indicate that about 14.6 million more people have had some vaccine and 13.2 million more people have had the recommended dosage of three or more shots since the fall of 1958 when comparable estimates were made.

Analysis of the 1959 polio experience made by the Communicable Disease Center, Public Health Service, Atlanta, Ga., was reported at this meeting. This analysis showed that the vaccine had proved to be at least 90% effective this year in protecting persons who had had three or more doses. In the three cities where major epidemics occurred in 1959—Des Moines, Iowa; Kansas City, Mo.; and Little Rock, Ark.—cases were concentrated among unvaccinated

persons living in crowded, lower economic areas. A similar pattern occurred in most of the fourteen other cities that reported moderate outbreaks.

The conference concluded that communities needed to start immediately to plan intensive campaigns which would include surveys to find the neighborhoods where most of the unvaccinated live. It was urged that special emphasis be placed on giving vaccinations to infants and preschool children—only 53% of whom have as yet had the recommended schedule of three or more injections. It was further urged that all persons who had their third injection a year or more ago get a fourth injection before next summer (1960).

Plans for a new advertising campaign to be conducted by the Advertising Council and sponsored by the Public Health Service, American Medical Association, and National Foundation were also announced at this meeting. The campaign will be launched in the early spring of 1960 to support local vaccination drives. (CommDis Branch, PrevMedDiv)

* * * * *

Salmonellosis

Salmonella infection is widespread in man and animals throughout the world. More than 500 different types of Salmonella have been described. Nearly all have been found in animals. The typhoid and paratyphoid bacilli are not discussed in this report.

Salmonellosis is most common in chickens, ducks, and turkeys; it is frequent in rodents, less frequent in swine, not uncommon in cattle, sporadic in sheep, and occasional in various wild animals. Mortality is especially high among newborn birds and animals. Direct and indirect losses are difficult to estimate accurately, but are undoubtedly very high.

The reported incidence of salmonellosis in man and animals is increasing, partly because of greater interest in the problem. The real incidence, however, is also increasing. In this connection, growing national and international distribution of human and animal foods susceptible to contamination is of great importance. Closest cooperation of the medical and veterinary professions is required before the problem of salmonellosis on both national and international scale can be solved.

Human Salmonellosis

The incidence of human salmonellosis has not been accurately determined in any country, but in countries where observations have been made, it is considerable. In England and Wales, for example, about 3,000 incidents (comprising sporadic cases, family outbreaks, or general outbreaks) are reported annually as compared with about 100 staphylococcal incidents. In the

United States, staphylococcus enterotoxin food poisoning is reported more frequently than salmonellosis, but the difference between the two countries is probably due to more complete reporting of small outbreaks and sporadic cases of salmonellosis in England and Wales than in the United States. In the Federal Republic of Germany in recent years numerous outbreaks associated with sausage, boiled ham, pork, eggs, and cheese have been reported. In Sweden some thousands of cases have occurred from consumption of domestic and imported meat. In Netherlands many outbreaks since World War II have been traced to meat products. Human salmonellosis, therefore, is common in many countries, and in countries where observations have been made over a period of time it appears to be increasing. It causes preventable deaths in the very young and very old, and is responsible for much minor disability and discomfort in persons of all ages. Furthermore, it is an example of distasteful transfer of bowel pathogens from man to man and from animals to man.

Salmonella typhimurium in most countries is the most common of its type isolated from cases in man and is a frequent pathogen in animals. Other types wax and wane in incidence in man from time to time and from place to place. S. heidelberg, for example, was first isolated in England and Wales in 1951, but by 1957 had become second most commonly isolated after S. typhimurium. No explanation of this increase has been found.

Salmonellosis Apparently Not Associated with Food

There are reports from many countries that human salmonellosis sometimes appears to spread through fomites or contact rather than directly from contaminated food. Most of these reports describe outbreaks in hospitals, particularly children's hospitals or closed communities. In the general population, however, such a mode of spread is less easy to prove. Direct transmission has been observed among animal attendants, poultry processors, and others having close contact with infected animals.

Foods Associated with Outbreaks

A partial survey of recent literature shows that of 200 outbreaks associated with food, 5 were associated with fresh meat, 87 with processed or made-up meats, 41 with shell eggs (mainly duck eggs) and egg products (frozen eggs, egg albumen, egg yolks), 23 with cream confectionery, 10 with milk, and 34 with a wide variety of foods. Most of the incriminated processed and made-up meats were composed wholly or partly of pork products. Therefore duck eggs, egg products in general, and pork products play a substantial part in the causation of salmonellosis in man.

The Human Excretor

The role of the human excretor as a source of salmonellosis is difficult to assess. Food handlers frequently have been blamed as the source of infection

because, on examination, they have been found to be excretors. In many instances, however, the food handlers were probably infected from the foods and were as much victims as the consumers of the food. In Britain and the United States, the carrier rate in the general population has been estimated at about 2 per 1000. Man is himself a reservoir of Salmonellae and at any given time there must be many food handlers who are symptomless excretors.

A high standard of personal hygiene in food handlers and the provisions of adequate facilities for attaining this standard in commercial kitchens, packing plants, and meat preparation factories would certainly reduce the incidence of infection.

Human and Animal Foods Liable to Contamination with Salmonellae

Eggs and Egg Products

Duck eggs. Studies in Germany, the Netherlands, and other countries have shown that a proportion of duck eggs are contaminated with Salmonellae, usually S. typhimurium and sometimes S. enteritidis. In England and Wales, in 1954, a study indicated that 1.5 per thousand of the 126 million duck eggs sold per annum at the time of the report were infected. Duck eggs may be infected in the ovary or oviduct or through the shell. Improvements in farm hygiene would reduce contamination through the shell, but the problem of ovary and oviduct infection would still remain. Duck eggs should be marked as such, and users of duck eggs in the shell should be warned—for example, by notices exhibited in shops selling the eggs. There is merit in insuring that duck eggs are sterilized before the shell is broken as the use of raw duck eggs in a kitchen may lead to transfer of infection from the egg contents to lightly cooked or uncooked dishes via mixing bowls or wash-water.

Hen eggs. Though outbreaks of human salmonellosis due to hen eggs in the shell are occasionally reported, they are rare.

Egg products. Egg products—dried whole egg, frozen whole egg, liquid whole egg, egg albumen, and egg yolk—have been shown to be very important sources of Salmonellae. Up to 20% of samples recently have been shown to be infected. Hen eggs are usually contaminated from the shell. Use of clean, rapidly cooled, first quality hens' eggs for preparation of egg products would reduce but would not eliminate risks. Production of uniformly safe egg products requires pasteurization of the liquid before distribution. A temperature of 140° F. or 146° F. (60°C. and 63.3°C.) for 3 and 2 minutes respectively has been shown in the laboratory and commercial practice to kill Salmonellae in whole eggs without appreciably changing the qualities of the product. The temperature range between killing Salmonellae and coagulating the egg is small, and careful control of the temperature is necessary. With dried albumen a different process can be used. It can be heated to 128° F. (53.3° C.) for 6 days in bulk without reducing its usefulness to the baker or confectioner. In practice, 3 days are needed to raise the temperature

of bulk quantities to the required level, and 2 days are needed for the containers to cool, so that the whole process occupies 11 days.

Meat

Poultry. That poultry can be a source of extensive food poisoning has been shown recently in the United States where some hundreds of cases were associated with widely distributed pre-packed chicken salad contaminated with S. blockley. Roasted turkeys are frequently, and chickens occasionally, a source of infection in the United States, especially in institutions and schools.

Beef, Veal, Pork. In some countries, consumption of raw beef or veal is a common source of human salmonellosis, while in other countries, pork is more often incriminated. Boned beef and veal, pig liver, and fresh and smoked sausages have been mentioned most frequently.

Sometimes human food handlers contaminate meat with Salmonellae. Often contamination appears to come from infected animals. Infection may take place during shipment or in overloaded holding-pens at the abattoir, and extensive contamination of the meat may follow during processing of carcasses.

Milk

When milk is routinely pasteurized, the risk of its being a source of human salmonellosis is small, although a number of recent outbreaks have shown that unhygienic bottling of pasteurized milk may be a danger. Outbreaks from unpasteurized milk occur from time to time either as a result of salmonellosis in a cow—S. dublin is often the cause—or as a result of introduction of infection by food handlers. Milk products, cheese in particular, have sometimes been incriminated.

Fish

In temperate climates, cooked fish is seldom incriminated in food poisoning; where uncooked fish is eaten, however, salmonellosis sometimes occurs. In the warmer climates and where fish are caught in sewage-polluted waters, there are greater risks, and more observations are required before the problem can be accurately defined. Despite the well known risk of typhoid and paratyphoid from shellfish gathered from sewage-polluted waters, there is little evidence of shellfish as vehicles of food poisoning Salmonellae, although such bacilli have been isolated from the shellfish and the waters in which they live.

Vegetable Products

The danger of contamination of vegetables and vegetable products in the field or afterwards by fertilizers, infected water, or sewage should not be overlooked.

Animal Foods and Fertilizers

These products are being produced in many parts of the world from inedible offal and scraps from slaughterhouses, meat packing plants, retail food dealers, et cetera, and from other raw materials, especially whole carcasses of animals that have died from disease.

Recently it has become known that such carcasses may be more or less heavily contaminated with Salmonellae, including many uncommon serotypes. In some European countries, it has been realized that after the import of such contaminated products, particularly fish meal from Africa, Salmonellae of types hitherto unknown in those countries have made their appearance in the animal and human populations and have caused food-borne outbreaks in man.

Although in some countries fish meals are produced in a manner that entails a heating process that insures killing of Salmonellae present in the raw product, some fish meals heavily contaminated with Salmonellae are being produced by milling sun-dried fish. Such fish is very liable to contamination from birds and rodents during the drying process. Introduction of more satisfactory methods of production in the countries concerned should be encouraged. Until such methods can be inaugurated, countries which have to import animal foods will have to consider the necessity for reesterilization of the products.

It has now been shown that concentrates of vegetable origin (e.g., cotton-seed cake, sunflower cake, groundnut cake, and alfalfa) may be contaminated with Salmonellae. Further investigation is needed to determine the sources and degree of this contamination and the possibilities of sterilizing the products.

It is strongly recommended that in plants where these foods and fertilizers are made there should be a strict separation between the "unclean" section where raw materials are kept and the "clean" department where sterilized meal is milled, sacked, and stored, so as to prevent secondary contamination of the final product from raw products. The meal should also be protected during storage against possible contamination from rats, mice, birds, reptiles, and insects.

Introduction of Salmonella-contaminated foods into factories which prepare mixed animal feeds may lead to contamination of mills and other equipment from which, in turn, other products may become contaminated. In this connection the dangers of re-using sacks which have contained potentially contaminated material should be remembered.

Control of Human Salmonellosis

There is a lack of information on the true incidence of salmonellosis in man and animals in all countries. Careful investigation of outbreaks would improve knowledge of the nature and extent of the problem. Methods of investigation of human salmonellosis and of other types of food poisoning

were given in the First Report of the Joint FAO/WHO Expert Committee on Meat Hygiene. Experience has shown that, in many outbreaks, even when they are thoroughly investigated, it is difficult to trace the food or food ingredient responsible. Mention has already been made of cross-contamination of foods in kitchens and food factories. Where there are the necessary facilities, surveys should be made of foods or other substances which from their nature or method of handling might be contaminated.

So far as present knowledge allows formulation of control measures, it may be said that they should include the following:

1. Reporting of cases so that they and their contacts may be prevented from spreading the disease.
2. Education of caterers and food handlers in a high standard of kitchen and personal hygiene.
3. Proper refrigeration of foods.
4. Effective pasteurization of milk.
5. Hygienic production of eggs and cold storage if possible; hygienic preparation of egg products; and, effective heat treatment of the final product before distribution.
6. Sterilization of animal food liable to contamination.
7. High standards of abattoir hygiene.

These measures are self-evident and in many countries some attempts are being made to apply them. Heat treatment of food for animals so far has been used very little.

Pasteurization of egg products is being actively pursued at least on an experimental scale, but there are still problems to be overcome. The small difference between the temperature which insures death of Salmonellae and that which results in coagulation of the product raises difficulties when the method is applied commercially. There is need, too, for a test, such as the phosphatase test for milk, to insure that the pasteurization method is being used effectively. Despite difficulties, health authorities should press for legislation to insure that egg products free from Salmonellae are distributed. It is impossible to measure the contribution made by egg products to human salmonellosis, but they are so widely used in "dangerous situations"—bakeries, confectioneries, cooked meat factories, and the like—that they may well be a major source of trouble even though it has been found difficult to trace specific outbreaks to this source.

The main food source of human salmonellosis, however, is meat. Therefore, the importance of a high standard of hygiene in abattoirs and meatpacking plants cannot be overemphasized. Rapid and adequate cooling of carcasses (preferably below 10° C. (50° F.)) is essential. This applies also to edible offal which is going to be packed in barrels or boxes for further handling.

It has been shown by more than one investigator that, while cattle and pigs fed with Salmonella-contaminated foods or which are otherwise naturally infected do not necessarily show illness, their organs may contain Salmonellae.

During processing of carcasses in abattoirs widespread contamination of the meat passing through the abattoir can occur. At least one very large human epidemic in recent years originated in this manner, and there is no doubt that abattoir contamination of meat has caused many other outbreaks. Health and veterinary authorities should insure hygienic operation of abattoirs by demanding application of all possible sanitary measures including bacteriologic checks. Food processing plants should also be subjected to similar precautions and control procedures. It is the responsibility of the food industry itself to develop the use of bacteriologic methods in the sanitation of food processing. In some countries this is already regulated by the government.

When widely distributed foods have been freed from *Salmonellae*, the problem of human salmonellosis will have to be reassessed and perhaps then it will be possible to define the role of the human symptomless excretor in the food factory and kitchen.

In investigation of salmonellosis, full use should be made of resources of national and international *Salmonella* centers. (WHO, Second Report of Joint WHO/FAO Expert Committee on Zoonoses: Technical Report Series No. 169, 1959)

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Surveillance of Malaria in the United States - 1958

During 1958, 94 cases of malaria were reported to the Communicable Disease Center from 23 states and Hawaii. Confirmed and presumptive cases numbered 72. Of these, 65 were of foreign origin. Thirty-three of these cases were in military personnel, the majority contracting their illness in eastern Asia (Korea 9, Philippines 9). A total of 32 civilian cases of foreign origin came from 17 different nations. Mexico with 7 cases still leads the list, although the numbers of cases acquired in Mexico has been dropping rapidly in recent years. The malaria eradication campaign in Mexico is considered to be a major factor in this decline.

Only three naturally acquired, indigenous cases were reported—one each from California, Arizona, and Pennsylvania. Actual places of origin of these cases could not be determined and no associated cases or endemic foci were found.

Four cases apparently resulting from blood transfusions were reported. A blood donor for one of these cases was identified as having a silent *P. malariae* infection, implying that, in 1958, the risk of acquiring malaria in the United States was greater from blood transfusions than from natural causes. Occurrence of these transfusion-acquired cases suggests the possibility that there may be numerous silent malaria infections in this country. These silent parasitemias do not, however, appear to be an important source of plasmodia

capable of introducing the infection into the mosquito population and creating endemic foci.

As long as malaria prevails in other parts of the world, threat of malaria outbreaks in the United States remains. Anopheline mosquitoes are abundant and their opportunities for survival increase with the increasing amount of land under irrigation. Only through careful surveillance of malaria and investigation of each reported case with the promptness and vigor customary in the investigation of cases of smallpox or plague can we preserve the near freedom from malaria we are currently enjoying. (Brody, J.A., Dunn, F.L., Malaria Surveillance in the United States, 1958: Am. J. Trop. Med. & Hyg., 8: 635-639, November 1959)

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Maintenance of Conductive Floors

Safety engineers and other industrial executives, because of increasing use of explosive materials and gases in their plants and laboratories, are becoming concerned over the safety of employees and the protection of plants against hazards of explosions.

One of the chief causes of explosions is static electricity. Static charges originate from many sources. The movement of a machine, or the normal motion of persons wearing certain types of clothing, can create static electric sparks that are capable of causing violent explosions.

Because hospitals have experienced this problem, there is much to be learned from the research and development done for them. The problem became so acute that a U.S. Government report stated, "There is probably no combination of personnel and equipment anywhere more liable to produce casual dangerous charges of static electricity than that found at present in the anesthetizing areas of most hospitals."

Prevention of Static Electric Sparks. Certain precautions can be taken to reduce the amount of generated static electricity. The use of unironed cotton clothes, conductive-soled shoes, and nonsparking metals will help. Static electric sparks can be prevented by electrically "tying" every possible static charge producer together. This prevents generation of different electric potentials.

To do this, many plants run grounding strips from metal fixtures and equipment to a common ground which equalizes electrostatic potential throughout the work area. The common ground is usually a conductive floor which allows static electric charges to safely pass from a person, or from equipment, through the floor. The floor must then quickly and easily dissipate the static electricity.

Importance of Conductivity. A floor must be durable, waterproof, and have permanent adhesion. Above all, it must be permanently conductive at safe levels.

Conductive floors are difficult to keep clean and at the same time conductive. Because of fat content, ordinary soaps and waxes form a film that soon insulates a conductive floor and destroys its conductivity. The claim that one very thin coat of standard wax or seal is as safe as a special wax for conductive floors creates a dangerous situation and requires careful investigation.

Cleaning and Waxing of a Conductive Floor. If a conductive floor is effective upon installation, it is logical to assume that an important cause of conductive failure is improper maintenance of the floor surface. So the questions arise: Which wax is safe to use on a conductive floor? Should a conductive floor be scrubbed and waxed at all?

As in all questions of such importance, the opinion of experts is the most valuable. The National Fire Protection Association (N.F.P.A.) says, "Any waxes, polishes, or dressings used for floor maintenance of conductive floors should be of an electroconductive type."

Underwriters' Laboratories Test Products. Underwriters' Laboratories, Inc. (UL), member of N.F.P.A., performed exhaustive tests on a wax designed specifically for conductive floors and a cleaner which was considered safe for use on conductive floors.

Specimens of conductive flooring were coated with the electroconductive-type wax. These waxed surfaces were then coated twice each working day with various antiseptic solutions which are usually encountered on the floors of operating rooms. After 24 applications of each antiseptic, results showed that only a minor change had occurred in electrical resistance, and frequent scrubbing with the cleaner had not materially affected the conductivity of the flooring.

Test flooring samples were coated with the special wax for conductive floors and stored in an airtight vessel containing calcium chloride. After 4 weeks in this bone-dry atmosphere, tests proved that all samples remained within the proper N.F.P.A. limits for safety.

A series of tests were performed on several conductive flooring materials using the wax for conductive floors. Two coats of wax were applied to each of the various materials. The surfaces were mopped daily with clear water. Once a week for 6 weeks the wax was removed, using the cleaner for conductive floors, and the flooring was rewaxed. At the conclusion of this accelerated test series, results showed all samples to be safe.

Many industrial plants and hospitals are relying upon statements of the N.F.P.A. and tests of UL regarding a safe wax and cleaner for conductive floors. Uncolored conductive floor wax is being used on all nonconductive floors which adjoin conductive floor areas to avoid tracking of nonconductive wax onto the conductive flooring.

To Wax or Wane? While some authorities state that a conductive floor need not be waxed, it can be stated that no floor must be waxed. However, most unwaxed floors are not acceptable to the user. Floors which are not

waxed are harder to maintain, unattractive, and impossible to keep sanitary. Wax protects the flooring and provides a smooth surface from which soil may be easily removed.

The Floor's Purpose. Except for the wax and cleaner which must have safe electric properties, conductive floors can be maintained in the same manner as any other floor. To stay within safety limits established by N.F.P.A. a conductive floor wax and cleaner which bears the seal of UL Reexamination Service should be used, thereby doing everything possible to safely maintain conductive floors and reduce the danger ever present in static electricity. (Brenn, J.L., How to Maintain Conductive Floors: Safety Maintenance, 118: 17-18, November 1959)

NOTE: BuMed Instruction 5100.1B, Code for Use of Flammable Anesthetics (Safe Practice for Hospital Operating Rooms), 24 November 1959, directs attention to ignition hazards of flammable mixtures of combustible anesthetic agents, and to measures applicable in reduction and control of these hazards.

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